## We claim:

- A process for preparing 2-keto-L-gulonic C<sub>4</sub>-C<sub>10</sub>-alkyl esters by esterifying 2-keto-L-gulonic acid (KGA) with a saturated, branched or unbranched C<sub>4</sub>-C<sub>10</sub>-alcohol, which comprises, in a preliminary esterification, reacting an aqueous KGA solution with a C<sub>4</sub>-C<sub>10</sub>-alcohol under acid catalysis up to a degree of esterification of from 20% to 70% and dehydrating the product in a continuous rectification apparatus using a C<sub>4</sub>-C<sub>10</sub>-alcohol, as a result of which the esterification reaction advances.
- A process as claimed in claim 1, wherein the alcohol is a
  saturated, branched or unbranched alkyl alcohol having from 4 to 10 carbons, preferably n-butanol.
- A process as claimed in claim 1 or 2, wherein, in the preliminary esterification, the alcohol is used in a mass
  ratio to the KGA content in the aqueous solution of from 1:1 to 5:1.
  - 4. A process as claimed in any of claims 1 to 3, wherein the catalyst is an acid heterogeneous or homogeneous catalyst.
  - 5. A process as claimed in any of claims 1 to 4, wherein the catalyst is a mineral acid.
- 6. A process as claimed in any of claims 1 to 5, wherein the preliminary esterification is carried out in a continuous-flow stirred tank.
  - 7. A process as claimed in any of claims 1 to 5, which is carried out under the following conditions:
    - a) mean residence time of the aqueous KGA in the preliminary esterification from 1 to 3 h,
- b) reaction temperature in the preliminary esterification from 65°C to 120°C; and/or
  - c) mass ratio of KGA content to  $C_4-C_{10}-alcohol$  from 1:1 to 5:1; and/or

25...

35

- d) reaction temperatures during the entire process from 50°C to 120°C and/or
- 5 e) use of from 0.02 to 0.03 mol of sulfuric acid per mole of KGA as catalyst.
- A process as claimed in any of claims 1 to 7, wherein the aqueous KGA solution, before entry into the preliminary esterification reactor, is concentrated up to the solubility limit of KGA.
  - 9. A process as claimed in any of claims 1 to 7, wherein the aqueous KGA solution, before entry into the preliminary esterification reactor, is concentrated to above the solubility limit of KGA.
- 10. A process as claimed in any of claims 1 to 9, wherein the continuous rectification apparatus (2) is equipped with an evaporator (3) and a condenser (4), and also preferably with a phase-separation apparatus (5) and/or a vacuum system (6).
- 11. A process as claimed in any of claims 1 to 9, wherein the preliminary esterification reactor (1) is equipped with an additional column (7), an additional evaporator (8) and an additional condenser (9) and also preferably with an additional phase-separation apparatus (10).
- 12. A process for preparing ascorbic acid, which comprises the process as claimed in any of claims 1 to 11 and the 2-keto-L-gulonic C<sub>4</sub>-C<sub>10</sub>-alkyl ester prepared being converted to L-ascorbic acid in one or more steps.

35

15

40

Process for preparing 2-keto-L-gulonic C4-C10-alkyl esters

## Abstract

5

The invention relates to a process for preparing 2-keto-L-gulonic acid  $C_4$ - $C_{10}$ -alkyl ester by esterifying 2-keto-L-gulonic acid (KGA) with a saturated, branched or unbranched  $C_4$ - $C_{10}$ -alcohol, which comprises, in a preliminary esterification, reacting an aqueous

10 KGA solution with a  $C_4$ - $C_{10}$ -alcohol under acid catalysis to a degree of esterification of from 20% to 70%; and dehydrating the product in a continuous rectification apparatus using a saturated, branched or unbranched  $C_4$ - $C_{10}$ -alcohol, as a result of which the esterification reaction advances. Preferably, the alkyl

15 alcohol is n-butanol. In a preferred embodiment, the aqueous KGA solution is concentrated before the esterification up to the solubility limit or above, preferably under catalysis by a homogeneous or heterogeneous catalyst, in particular sulfuric acid, and at temperatures of from 50°C to 120°C. In a further

20 embodiment, in one or more further steps, the KGA ester prepared is converted to L-ascorbic acid.

25

30

35

40